MINNESOTA WEST COMMUNITY & TECHNICAL COLLEGE
COURSE OUTLINE

Faculty are required to have the outline submitted to the Academic Affairs Office. The course outline is the form used for approval of new courses by the Collegewide Curriculum Committee.

DEPT. **ENGR** COURSE NO. **2214**

NUMBER OF CREDITS: **3**

COURSE TITLE: **ENGINEERING MECHANICS--STATICS**

CATALOG DESCRIPTION: **This course includes vector resultants of force systems in two and three dimensions, equilibrium of forces, analysis of forces acting on structural and machine elements, friction, moments of inertia, and virtual work.**

AUDIENCE **Engineering students—second year course**

FULFILLS MN TRANSFER CURRICULUM AREA(S) ***(Leave blank if not applicable)***
Science and Math Areas will already be satisfied by the prerequisites for this class

PREREQUISITES OR NECESSARY ENTRY SKILLS/KNOWLEDGE: **Physics 2121 and Math 1122(Calculus 2)**

LENGTH OF COURSE: **One Semester**

THIS COURSE IS USUALLY OFFERED:
Every other year ☐ fall ☐ spring ☐ summer ☐ undetermined ☒

Four goals are emphasized in course at Minnesota West Community & Technical College:

1) ACADEMIC CONTENT: The academic objectives of this course are:

(a) to acquire the ability to conduct analysis of equilibrium conditions of rigid bodies.
(b) to develop a systematic and orderly approach to the analysis of engineering problems.
(c) to develop the ability to make free body diagrams.

2) THINKING SKILLS: This course will help students to improve the effectiveness of their thinking skills through:

(a) developing problem-solving strategies.
(b) using many types of problems in engineering to model physical behavior and physics principles
(c focusing on the scientific method of observation, hypotheses formulation, logical and evaluative deduction.

3) COMMUNICATIONS SKILLS: This course will help students improve their oral and written communication skills through:

a. Writing concise solution papers to physical problems.
b. Interpretation of results of problem solving to others.
c. Group problem solving.
d. Using short writes for expressing the meaning and interpretation of physical principles.
e. Oral interpretation of related problems.

4) HUMAN DIVERSITY: This course will help students recognize, understand and appreciate human diversity by:

a. Working in small groups especially in the problem solving to experience ways diverse people solve problems and interpret data.
b. Changing partners from time to time to enrich each person's point of view.

TOPICS TO BE COVERED:

Fundamental concepts and principles of mechanics.
Statics of particles—forces in the plane and in space.
Rigid bodies—Equivalent systems of forces—use of vectors.
Equilibrium of rigid bodies in two and three dimensions..
Distributed forces—Centroids and centers of gravity—areas, lines and volumes..
Analysis of Structures—Trusses, frames and machines.
Forces in beams and cables.
Frictional forces.
Moments of inertia and areas and masses.
General method of virtual work.

LIST OF EXPECTED COURSE OUTCOMES: The academic objectives of this course are:

(a) to acquire the ability to conduct analysis of equilibrium conditions of rigid bodies.
(b) to develop a systematic and orderly approach to the analysis of engineering problems.
(c) to develop the ability to make free body diagrams.

LEARNING/TEACHING TECHNIQUES used in the course are:

- ☒ Collaborative Learning
- ☐ Student Presentations
- ☐ Creative Projects
- ☒ Lecture
- ☐ Demonstrations
- ☐ Lab
- ☒ Problem Solving
- ☒ Interactive Lectures
- ☒ Individual Coaching
- ☐ Films/Videos/Slides
- ☐ Other (describe below)

ASSIGNMENTS AND ASSESSMENTS FOR THIS CLASS INCLUDE:

- ☒ Reading
- ☐ Oral Presentations
- ☒ Textbook Problems
- ☐ Group Problems
- ☐ Other (describe below)
- ☒ Tests
- ☐ Worksheets
- ☐ Papers
- ☐ Term Paper
- ☐ Individual Projects
- ☐ Collaborative Projects
- ☐ Portfolio

EXPECTED STUDENT LEARNING OUTCOMES:

1. The student will acquire the ability to conduct analysis of equilibrium conditions of rigid bodies.
2. The student will acquire a systematic and orderly approach to the analysis of physical engineering problems.
3. The student will acquire the ability to make detailed free-body diagrams.

The information in this course outline is subject to revision

Veteran Services: Minnesota West is dedicated to assisting veterans and eligible family members in achieving their educational goals efficiently. Active duty and reserve/guard military members should advise their instructor of all regularly scheduled military appointments and duties that conflict with scheduled course requirements. Instructors will make every effort to work with the student to identify adjusted timelines. If you are a veteran, please contact the Minnesota West Veterans Service Office.

To receive reasonable accommodations for a documented disability, please contact the campus Student Services Advisor or campus Disability Coordinator as arrangements must be made in advance. In addition, students are encouraged to notify their instructor.

This document is available in alternative formats to individuals with disabilities by contacting the Student Services Advisor or by calling 800-658-2330 or Minnesota Relay Service at 800-627-3529 or by using your preferred relay service.